Auto Coater by Fabon Pharmatech Pvt. Ltd., Nashik – A Definitive Guide for Modern Pharmaceutical Coating Technology

1. Introduction

In pharmaceutical manufacturing, **tablet coating** is an essential downstream process that significantly influences product performance, stability, patient compliance, and brand identity. A modern **Auto Coater** mechanizes this process, enabling uniform coating with high throughput, regulatory compliance, and precise process control.

Fabon Pharmatech Pvt. Ltd., a prominent pharmaceutical equipment manufacturer based in **Nashik, Maharashtra, India**, designs auto coaters tailored to the evolving demands of global pharmaceutical production. These machines support film coating, enteric coatings, sugar coatings, **controlled release systems**, and other advanced coating needs — making them indispensable for both small and large-scale manufacturers.(fabon-pharma.com)

This comprehensive article explores how Fabon's auto coater works, its components and technology, applications, benefits, regulatory considerations, operational best practices, future trends, and its role within modern pharma production.

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2. What Is an Auto Coater?

An **Auto Coater** is a sophisticated machine used to apply coatings to **tablets, pellets, capsules, and similar solid dosage forms** in a controlled and uniform manner. Unlike manual or semi-automatic coaters, auto coaters offer **automated control systems**, precise spray delivery, optimized airflow, and batch recipe management — helping manufacturers achieve consistent coating quality and comply with stringent regulations.(fabon-pharma.com)

Fabon's auto coaters are designed primarily for pharmaceutical use and adhere to **cGMP (Current Good Manufacturing Practice)** standards, incorporating **stainless steel construction**, **HEPA filtration**, **PLC-based control systems**, and advanced **spray technology**.(fabon-pharma.com)

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3. Historical Context & Industry Importance

3.1 Early Coating Practices

Tablet coating started as a manual process where tablets were tumbled in rotating pans while coating fluids were applied with brushes or simple sprayers. These methods were labor-intensive, imprecise, and unsuitable for large batches. As pharmaceutical production scaled up in the mid-20th century, mechanized coaters emerged, transforming tablet coating into a reproducible, controlled process.

3.2 Evolution to Auto Technology

Through the late 20th and early 21st centuries, coating technology advanced to include **PLC automation, programmable recipe systems, HEPA filtration**, and enhanced air-handling systems. These innovations improved uniformity, reduced contamination, and increased throughput — laying the foundation for today's auto coaters like those built by Fabon Pharmatech.(fabon-pharma.com)

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4. Why Tablet Coating Matters

Tablets are often coated for multiple reasons beyond aesthetics. Coatings can:

- **Mask unpleasant taste and odour**, improving patient compliance.
- **Protect APIs from moisture, light, or gastric acid**, enhancing stability.
- **Control drug release profiles**, such as enteric, delayed release, or sustained release.
- **Improve mechanical strength**, reducing chipping during packaging and transit.
- **Differentiate brands** with unique colours and finishes.(fabon-pharma.com)

These diverse needs require precise control over **spray rate, pan rotation, airflow, and drying**, which modern auto coaters provide.

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5. Core Components of Fabon's Auto Coater

A typical Fabon auto coater integrates several sophisticated subsystems:

5.1 Coating Pan & Drum Assembly

- **Perforated or non-perforated coating pan**, usually made of **SS 316L for product contact surfaces**.

- Rotates at adjustable speeds (commonly ~3–30 RPM) to ensure gentle, uniform movement of tablets in the coating bed.
- Internal **baffles** optimize tablet tumbling and exposure to spray.(fabon-pharma.com)

5.2 Spray System

- **HVLP (High Volume Low Pressure) spray guns** are standard, creating fine droplets for uniform coating.
- **0.5–1.5 mm spray nozzles** enhance precision of droplet size and spray distribution.
- Multiple guns (typically **2–8**) are configured based on drum size and batch requirements.
- A **peristaltic pump** ensures controlled delivery of coating solution.(fabon-pharma.com)

5.3 Air Handling & Drying

- **Hot air blower systems** (5–30 kW) deliver heated, filtered air into the drum.
- Adjustable **temperature control (25°C to 80°C)** supports drying without harming tablets.
- **HEPA filtration (H13/H14)** ensures clean air intake, eliminating contaminants.
- Exhaust blowers (200–2000 CFM) efficiently remove moisture and airborne particulates.(fabon-pharma.com)

5.4 PLC & Automation Control Panel

- **PLC-based HMI touchscreen** interface for real-time control and monitoring.
- **Recipe management** threads store multiple batch parameters (e.g., spray rate, pan speed, temperature).
- Monitors critical factors: spray volume, airflow, drum speed, and temperature profiles.
- Provides data logging useful for **batch records** and regulatory compliance.(fabon-pharma.com)

5.5 Safety & Compliance Features

- **Interlock systems** prevent operation when doors are open.
- **Automatic spray-gun cleaning systems** reduce nozzle clogging.
- **Explosion-proof motors** support safe solvent-based coatings.
- Designs comply with **cGMP and related health authority norms**.(fabon-pharma.com)

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6. Working Principle of an Auto Coater

Auto coaters operate through a sequence of controlled steps:

6.1 Tablet Loading

Uncoated tablets, pellets, or capsules are introduced into the perforated coating pan. Baffles inside the pan help distribute them uniformly as the drum rotates.

6.2 Pan Rotation

The drum rotates slowly, enabling tablets to cascade gently. This motion ensures each tablet receives adequate exposure to sprayed coating solution.

6.3 Spray & Dry Cycle

- The spray system applies coating solution in a fine mist directly onto the tablet surface.
- Simultaneously, heated and filtered air is introduced, drying the applied coating layer rapidly and evenly.
- Negative pressure or controlled airflow ensures consistent drying without clumping.(fabon-pharma.com)

6.4 Parameter Control

The PLC system precisely monitors and adjusts parameters — like spray rate, pan speed, and temperature — to ensure consistent coating thickness and smooth finish.

6.5 Discharge

Once the desired coating level and drying are achieved, the tablets are discharged through the outlet port for further processing (e.g., inspection, packaging).

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7. Specifications & Capacity Range

Fabon's auto coaters cover a broad range of batch capacities to suit different production needs:

- **Lab & Pilot Scale** (e.g., 1–50 kg batches) for R&D and small production runs.
- **Commercial Scale** (e.g., 50–1000 kg batches) for full manufacturing output.
- **Custom models** based on client specification (0.5 kg to 450 kg capacity is typical).(BoostKit)

Features include adjustable pan speeds, optimized perforation sizes (1–3 mm), and scalability for various tablet sizes and shapes.(fabon-pharma.com)

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8. Pharmaceutical Applications of Auto Coaters

Fabon auto coaters are suitable for many pharmaceutical coating processes:

8.1 Film Coating

Protective polymer or aqueous films are applied to tablets for:

- **Taste masking**
- Enhanced swallowability
- Moisture and light protection
- Brand identification (colour coatings)(fabon-pharma.com)

8.2 Enteric Coating

Delayed-release coatings ensure drugs withstand stomach acid and dissolve in the intestine — important for certain APIs like PPIs or NSAIDs.(fabon-pharma.com)

8.3 Sugar Coating

Used primarily for **taste masking**, especially in pediatric formulations and nutraceuticals.(fabon-pharma.com)

8.4 Controlled & Modified Release Coatings

Auto coaters enable applications that extend or delay drug release, improving therapeutic profiles and dosing regimens.(fabon-pharma.com)

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9. Benefits of Using Fabon's Auto Coater

9.1 Enhanced Uniformity & Quality

The combination of precisely controlled spray systems, accurately tuned airflow, and optimized drum motion ensures even coating distribution — essential for product performance and regulatory compliance.(fabon-pharma.com)

9.2 Automation & Data Accuracy

- **Recipe management** enables consistent batch performance, critical in regulated environments.
- Electronic logs support **batch traceability and audit readiness**.(fabon-pharma.com)

9.3 Reduced Operator Dependency

Automated controls reduce manual intervention, lowering the risk of human error and improving reproducibility.(fabon-pharma.com)

9.4 Compliance with Regulatory Standards

Stainless steel construction, HEPA filtration, automatic cleaning, and interlocks demonstrate adherence to cGMP norms, which are enforced globally.(fabon-pharma.com)

9.5 Improved Production Efficiency

Auto coaters significantly cut process times compared with manual methods and enhance throughput for high-volume batches.(fabon-pharma.com)

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10. Operational Best Practices

For optimal performance and longevity, the following practices are recommended:

10.1 Pre-Use Checks

- Inspect drum seals and filters
- Validate spray nozzle condition
- Confirm accurate temperature and airflow settings

10.2 Consistent Cleaning & Maintenance

- Use **CIP/WIP systems** if available
- Replace HEPA filters at recommended intervals
- Clean spray nozzles to prevent clogging

10.3 Parameter Validation

- Perform **IQ/OQ/PQ validation** to document performance over extended runs
- Validate spray patterns, pan speed, and drying efficiency

10.4 Operator Training

Regular training enhances process understanding and ensures adherence to SOPs.

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11. Regulatory & Validation Considerations

Auto coaters used in pharmaceutical manufacturing are subject to stringent validation requirements:

11.1 Design Qualification (DQ)

Ensures the machine design meets intended operational purposes.

11.2 Installation Qualification (IQ)

Documents correct installation and configuration of hardware and software.

11.3 Operational Qualification (OQ)

Verifies performance under anticipated conditions — including spray distribution, drying efficiency, and airflow stability.

11.4 Performance Qualification (PQ)

Confirms reliable performance across multiple batches, ensuring repeatability and product quality.

This validation supports regulatory filings and audits.(fabon-pharma.com)

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12. Troubleshooting Common Issues

Common issues and causes include:

- **Uneven coating** – inconsistent spray pattern or airflow imbalance.
- **Tablet sticking or picking** – excessive spray rate or inadequate drying.
- **Color variation** – unequal suspension of coating solution.

Addressing these requires fine-tuning spray parameters, airflow rates, and routine equipment servicing.(fabon-pharma.com)

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13. Auto Coater vs. Fluid Bed Coating

While auto coaters focus on **pan-type coating of tablets and pellets**, fluid bed coaters use a **fluidized bed** to suspend particles during coating. Each has advantages:

- **Pan coaters** — better for large tablets and precision coatings.
- **Fluid bed systems** — ideal for small particles and granular coatings.

In some production environments, both technologies are used complementary.(fabon-pharma.com)

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14. Industry Trends & Future of Coating Technology

Emerging trends include:

- **Process analytical technology (PAT)** for real-time monitoring.
- **Advanced control algorithms** for reduced cycle time.
- **Energy-efficient drying systems** to reduce operational cost.
- **Remote diagnostics and IoT integration** for predictive maintenance.

As pharmaceutical products diversify, auto coater technology will continue to evolve, offering greater precision, traceability, and automation to meet regulatory and market demands.

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15. Conclusion

The **Auto Coater by Fabon Pharmatech Pvt. Ltd., Nashik** stands as a robust, versatile, and compliant solution for modern pharmaceutical coating requirements. Built with high-quality materials, advanced automation, and flexible capacity options, it supports a wide range of coating needs — from taste masking and aesthetics to controlled release functionality. With precise spray systems, HEPA-filtered airflow, and PLC control, it delivers uniform coatings, enhances product quality, and supports regulatory compliance across pharmaceutical manufacturing.(fabon-pharma.com)

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